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The more, the better? Diversification Trends in Executive and Supervisory Boards in Germany and their Potential Effects

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Abstract

In 2015, Germany passed the Gender Quota Law, and while some countries compelled listed companies to reserve at least 30% of their executive seats for women, imposing fines on the firms that failed to comply, Germany favoured soft-law quotas with almost no penalties. Additionally, this policy focused solely on supervisory board quotas and measures to counteract women's under-representation, neglecting other demographic and cognitive groups. Given the increasingly diverse population in Germany, it is necessary to study the role of other diversity dimensions in the board composition from the financial and social perspectives and whether there are any development trends in the German boards. In my Bachelor thesis, I study whether there are any diversity improvements in the composition of German-listed companies' executive and supervisory boards, presenting recent academic findings on the drivers and the effects of diverse boardrooms. Moreover, I conduct a descriptive analysis of the German board diversity trends, implementing a novel diversity index of Bernile, Bhagwat, and Yonker (2018) covering various diversity facets.

Keywords: Controlling; Leadership; Board diversity; ESG; Corporate governance.

1. Introduction

It is widely believed that the Great Depression of 2008 resulted from governance failures (Berglof, 2011, p.500), as corporate boards have been condemned for the inability to impede the critical period and prevent severe economic fallouts. Many economists like Guest (2019) attribute this failure to the lack of diversity in the companies' boards, initiating a new wave of analyses and an extended appeal for diversity. In academic and regulatory spheres, board characteristics, such as gender, ethnicity, and functional background, have gained growing attention, as these might presumably influence the effectiveness of the decision-making process (Fernández-Temprano & Tejerina-Gaite, 2020, p.325).

Additionally, as societies are becoming more diverse in the last years and companies rely increasingly more on cross-functional teams to address complex issues, the question of how workgroup diversity affects team performance is more relevant than ever before (Plaut, 2010). The rapid technological change and globalisation have led to unprecedented environmental competitiveness, and thus, many proclaim diversity as a potential mean to develop more responsive and adaptive companies (Wright & Snell, 1999, p.49).

Acknowledging the substance of this topic, many researchers and practitioners have partaken initiatives during the last decade to generate a broader understanding of the diversity effects and its necessity. The present thesis tries to contribute to this mission as it examines the existence of the diversity trends in the German corporate context and the potential economic effects of board diversity, exploring the emerging literature on this issue.

To start with, I outline the primary goals of corporate governance regulations and their relation to board diversity. The focus lies primarily on the German corporate governance system and the enacted gender quota regulation, as this sets the ground for the later descriptive analysis. Then,

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I describe the main idea of board diversity, its dimensions, and the several possible methods to classify these characteristics, as this might be valuable when conducting scholarly research. However, during the study, my attention is mainly attributed to the demographic and cognitive distinction of diversity, as these two groups have been focal points for most researchers (Bernile et al., 2018; Erhardt, Werbel, & Shrader, 2003; Kilduff, Angelmar, & Mehra, 2000; Williams & O'Reilly III, 1998).

After these clarifications, I move to the central part of this thesis. First of all, it is essential to delineate potential determinants of board diversity. In *Section 2.4.1*, I concentrate on the firm internal drivers, these being firm and board size, the degree of shareholder concentration, as well as the interconnected influence of different diversity dimensions. Furthermore, since all firms are linked to their external environment (Daft, 2013), *Section 2.4.2* presents conceivable diversity driving factors outside the firm. It is worth noting that the firm external environment could play a principal role in this study, as most arguments regarding the effects of board diversity rely to some extent on this component.

The attention then turns to the analysis of the possible effects of board diversity. In *Section 2.5.1*, I summarise the results from the literature on the board diversity impacts on firm performance. Then, I focus on the correlation between firm risk and board diversity, as it could be a critical area for the profitability and the existence of many companies. This is followed by a discussion over the effects of board diversity on board compensation. Lastly, I provide an overview of other potential effects, concentrating on corporate policy formulation and innovation processes.

Moreover, even though various sources yearly document the board diversity developments worldwide, especially after the introduction of the gender quotas in many countries, these reports commonly focus on female representation. This fact could explain my interest in the descriptive research in *Section 3*, where I describe the measurement methods and then present actual evidence on the board diversity trends in German listed companies over the last twenty years. The uniqueness of this study is the implementation of a novel diversity index following Bernile et al. (2018), which aims to simultaneously capture the development of different diversity elements, such as gender, age, nationality, university affiliation, financial expertise, and board tenure of individuals. Further, I also disaggregate this diversity index and discern the development of the boards' demographic and cognitive traits and then discover the tendencies of each particular diversity attribute. In the last sections, I discuss the results, build several propositions for future research that stem from the evident trends and insights on the diversity effects, and conclude my thesis, also mentioning its limitations.

2. Literature Review on Board Diversity

2.1. Definition of Corporate Governance

The first review of the corporate governance topic presumably dates back to the times when this concept's definition did not exist. Berle and Means (1932) brought up a problem in their book when a firm manager did not act in line with its owner's interests, referring to one of the fundamental concerns of upper-management today, the so-called *principal-agent problem* (Eisenhardt, 1989). By delegating the decision-making authority from the *principal* (shareholders) to the *agents* (managers), an agency problem can occur due to the separation of ownership and control, affecting the wealth of both parties (Jensen & Meckling, 1976, p.309). Initially, corporate governance practices appeared to reduce such interest conflicts, but today, they have evolved into a more multifaceted topic, referring to the pool of mechanisms that influence the decision-making process of managers in a firm, assure that they pursue the objectives determined by the shareholders (Campbell & Mínguez-Vera, 2008, pp.436-439), and specify each member's rights and responsibilities (OECD, 2005).

Nevertheless, there are notable differences in corporate governance structures worldwide. While in the Anglo-American system, the prime objective is the optimal introduction of incentives and control to maximise the return on equity (ROE) (Shleifer & Vishny, 1997), in other countries, like Germany, the regulations strive to contemplate a broader spectrum of interests, such as these of the firm's employees and customers, and the potential conflicts with each other (Schmidt & Tyrell, 1997, p.344). Regardless of the corporate governance structure, a supervisory board of directors belongs to the essential firm internal mechanisms dedicated to ensuring that the shareholders' and managers' interests are closely aligned, to determining the overall corporate strategy, and to selecting, rewarding, or disciplining incompetent managers (Fauver & Fuerst, 2006, p.675).

Since the composition of the boards is seen as a powerful tool to improve corporate governance standards, today, many Corporate Governance Codes primarily concentrate on issues such as board diversity, board size, and the independence of directors (Carter, D'Souza, Simkins, & Simpson, 2010; Carter, Simkins, & Simpson, 2003). The existence of the diversity topic in the regulatory agenda is relevant due to its broad economic impacts, including not only the possible enhancement of the independence and the monitoring abilities of corporate boards, the generation of fresh ideas and perspectives (Anderson, Reeb, Upadhyay, & Zhao, 2011; Baranchuk & Dybvig, 2009), explained in *Section 2.5*, but also the promotion of social equity as well as the equal opportunities' provision (Sarhan, Ntim, & Al-Najjar, 2019, p.762). Thus, appointing members who improve the board diversity could establish more inclusive and fair business structures, benefitting existing shareholders (Terjesen, Sealy, & Singh, 2009, p.320).

2.2. Corporate Governance and Gender Diversity Requirements in Germany

Examining the German corporate landscape, its governance system can be defined as a *coordinated market system* that provides more strategic relations between firms and their stakeholders (Lane, 2003). According to domestic law, German stock companies, such as companies or partnerships lim-

ited by shares and limited liability companies, must possess a two-tier board structure with personal separation, meaning that nobody can be a member of both boards in the same firm simultaneously (AktG, 1965; Dittmann, Maug, & Schneider, 2010, p.41). Generally, this structure strives to separate decision management and control (van Veen & Elbertsen, 2008, pp.388-389) and formalise the particular governance function of outside directors as representatives of the firm's shareholders (Fauver & Fuerst, 2006, p.675). Similar to American boards, the German *supervisory board* is responsible for long-term planning and monitoring regarding the fulfilment of the company's financial goals and the appointment, performance review, and salary determination of the second board members, known as the *executive board*. The executives are in charge of the firm's everyday operations and must report back to the supervisory board on the overall performance (Fauver & Fuerst, 2006).

The corporate governance regulations in Germany also consider the topic of diversity. In 2015, the German government introduced its board-level gender quotas by the "Act on Equal Participation of Women and Men regarding Leadership Positions within the Sectors of Private Economy and Public Service". The first pillar of this act is the *Fixed Gender Quota*, which inducts a mandatory 30%-quota for the underrepresented gender in the German non-executive boards of organisations limited by shares. The predominant criterion is that the company is listed on a stock exchange and is subject to the German Codetermination Act. The second pillar is the *Individual Gender Quota*, which applies to all publicly traded companies that are not subject to the first quota, such as limited liability companies. As its title suggests, firms are free to determine their individual quotas; however, if the actual share of women is below 30% after establishing such individual quotas, the target share cannot be below the actual fraction. Non-compliance with the established quota regulations is sanctioned by empty board seats, meaning that the supervisory board is considered void if the election results do not abide by the government's requirements. This sanction persists until new elections provide results conforming to the law (BGBl, 2015).

2.3. Definition of Board Diversity

The present German Corporate Governance Code states "The Supervisory Board shall determine specific objectives (...) while taking the principal of *diversity* into account." (Regierungskommission, 2019, p.7). As it becomes evident from the wording, the regulation attends to the whole phenomenon of diversity without emphasising any particular feature. However, for the subsequent descriptive study of the board diversification trends in Germany, it is crucial to expound on the meaning of diversity and its various dimensions.

According to Harrison and Klein (2007, p.1200), the term *diversity* still lacks an explicit definition in academic literature. Yet, one suggested denotation of diversity is that it represents the occurrence of differences among members of a unit concerning a common property. In the corporate governance context, the concept of diversity relates to the board composition and the combination of different attributes and characteristics of its members that can interplay with board processes and decision-making (Van der Walt & Ingley, 2003, p.219). Some examples of these attributes are the director's age, gender, and professional background (Milliken & Martins, 1996). Hence, board diversity refers to the mixture of human, social, and intellectual capital that the board comprises collectively and draws upon engaging in its governance obligations (Van der Walt & Ingley, 2003).[1]

Besides, several categorisation methods of the various diversity dimensions have emerged over the years. One common practice is to differentiate between its demographic (observable) and cognitive (unobservable) attributes. The first group encompasses easily detectable directors' features, such as gender, ethnicity, and other demographic characteristics; while the unobservable attributes' group covers the directors' educational, functional, and occupational background, experience, perceptions, and values (Kilduff et al., 2000; Milliken & Martins, 1996). Other researchers suggest distinguishing between task-related and non-task-related (or relations-oriented) diversity dimensions (Adams, de Haan, Terjesen, & van Ees, 2015). Specifically, the task-oriented category encloses the directors' work-related capabilities to collect, process, and exchange information, negotiate and allocate resources (Pelled, Eisenhardt, & Xin, 1999). Contrarywise, the relations-oriented group includes attributes that evoke social cognitive processes, guiding team communication (Jackson, May, Whitney, Guzzo, & Salas, 1995, pp.216-219).

Finally, Pelled (1996) encourages the combination of the two categorisation methods in a matrix, where each attribute is simultaneously distinguished based on observability and task-relatedness. This two-fold distinction is helpful to understand whether specific observable or unobservable attributes contribute to the enhancement of the job-related skills of the board members. Thus, unobservable traits like the director's functional and educational background are usually highly task-related because of their strong association with job performance and expertise. Consequently, ensuring the representation of all four categories in a board could boost thoughtful and creative decision-making (Pelled, 1996; Williams & O'Reilly III, 1998).

[1] *Human capital* refers to the skills acquired by individuals from training and experience (Cambridge Dictionary, 2021). *Social capital* relates to the liaison among people working in the same group, promoting its efficient function (Bowles & Gintis, 2002, p.F419). *Intellectual capital* stems from mental processes that cultivate inputs for economic activity and value to its owners (Luthy, 1998, pp.3-4).

2.4. Determinants of Board Diversity

Before elucidating the potential effects of board diversity, it is essential to address its different drivers. Yet, one has to bear in mind that these two topics are interrelated, as shareholders may consider the potential gains and costs while selecting new board members to maximise the firm value (Arnegger, Hofmann, Pull, & Vetter, 2014, p.1111).

In the following sections, I separately observe firm internal and external drivers of diversity. The firm internal drivers can be directly regulated by the company, whereas the external drivers consider elements of the environment that influence the firm from the outside and are not under its control (Daft, 2013).

2.4.1. Firm Internal Drivers

First of all, Arnegger et al. (2014) consider the firm's size as an essential driver of board diversity, proclaiming that while firm size positively affects the directors' occupational background diversity, the diversification effect on the boardrooms' internationalisation is concave. These relations emanate from the benefits and costs of communication and conflicts. On the one side, the *resource dependence theory* (Pfeffer & Salancik, 1978) elucidates the benefits, pointing to the various resources such as expertise and communication channels that directors introduce to the board. In this sense, shareholders would prefer board heterogeneity to access numerous skills, knowledge, and linkages to necessary external contingencies generated from diverse occupational and national backgrounds (Hillman, Shropshire, & Cannella, 2007; Pfeffer & Salancik, 2003). Moreover, as the degree of complexity usually increases with firm size (Lawrence & Lorsch, 1967), shareholders could favour more diverse boards to better deal with the increased need for supervisory and administrative inputs (Bantel, 1993b). On the other side, despite the improvements in the decision-making process and the unique cognitive attitudes, occupational and international diversity also incur costs in terms of communication speed within the board due to the usage of jargon (Horwitz & Horwitz, 2007, p.992). According to the *social categorisation theory* (Tajfel, 1974) and the *similarity attraction theory* (Byrne, 1971), differences in values and attitudes, the decrease of trust and cooperation, and the rise of potential conflicts can lead to a general poorer performance. Overall, these trade-offs are central when shareholders appoint new directors, as they can explain their decision to keep internationalisation low when the firm size increases, avoiding the vast communication costs, and instead to increase occupational diversity due to the more bearable downsides (Arnegger et al., 2014).

Closely linked to the firm's size, another critical determinant of board diversity is the size of the boardroom (Zald, 1969). According to Chaganti, Mahajan, and Sharma (1985), larger boards offer a broader range of functions than only the usual services, purely by having more directors to spread around within the organisation. This can also boost board diversity more easily (Klein, 2002). Moreover, according to Sanders and Carpenter (1998, p.159), the board's size might reflect the complexity of the firm's external environment because of the increased need to react to changes swiftly and to enhance the information-processing capacity. Thus, larger boards necessitate diverse skills and perspectives that stem from board members with different traits to efficiently steer the company through business intricacies (Luoma & Goodstein, 1999).

Besides, the degree of shareholder concentration also affects board diversity. Specifically, the emergence of the *stakeholder theory* was prompted by the increasing need to consider a wider range of societal interests. One proxy for such interests is the presence of minority shareholders, or the degree of shareholder concentration measured by the percentage of shares held by the significant shareholders (Kang, Cheng, & Gray, 2007). Thus, by widening the domain of corporate governance beyond major shareholders to other stakeholders, such as suppliers and employees, board diversity can promote procedural justice due to the direct representation of different interests in the corporate decision-making (Luoma & Goodstein, 1999, p.554). Consequently, it is expected that a lower shareholder concentration results in a broadly represented board (Kang et al., 2007, p.198). This may help the company legitimise its activities to promote corporate social responsibility by introducing non-economic considerations, like environmental awareness and community involvement, into decision-making and by fostering more open governance processes that better assure the representation of the stakeholders' interests (Hillman, Keim, & Luce, 2001; Kang et al., 2007).

Finally, some diversity dimensions might also boost the existence of other diversity traits in the board. For example, it is documented that female supervisory and executive board members tend to also differ in their skills, experience, and age (Casteuble, Lepetit, & Tran, 2019, p.3). They are inclined to be younger than their male peers (Adams & Funk, 2012, p.229), have higher levels of education, and more international experiences (Singh, Terjesen, & Vinnicombe, 2008). Additionally, Hillman, Cannella, and Harris (2002, p.758) find that, in Fortune 1000 companies, female directors and other board members who enhance diversity tend to come from various, non-business backgrounds.

2.4.2. Firm External Drivers

From the firm's external perspective, the industry in which a company operates may also affect its board diversity level (Brammer, Millington, & Pavelin, 2007). For instance, supported by the *organisational contingency theory* (Galbraith, 1973), companies in some "non-masculine" sectors (e.g., service industries) can capitalise on the impacts of diversified boardrooms more efficiently because of the better market insights and the more significant interplay between employees and customers that emerge from diversification (Ali, Kulik, & Metz, 2011; Jackson, Schuler, & Rivero, 1989). Hyland and Marcellino (2002) assert that more than any other dimension, the number of women in the boardroom is correlated with the firm's industry. Hence, companies in healthcare or technology-related sectors are

more likely to employ female directors than organisations in technic-specific industries, such as oil, commodities, and construction (Harrigan, 1981, p.624; de Cabo, Gimeno, & Escot, 2011). The board's age diversity is also significantly influenced by industry since companies in consumer services are more likely to appoint directors from various age ranges. Specifically, these companies address customers of all ages, and so a variety of age groups in the boardroom can better speak for the consumers' interests (Kang et al., 2007, p.196). On the contrary, Adams and Ferreira (2007, 2009) argue that boards tend to be less gender and age heterogeneous in riskier environments and industries to enhance the boards' monitoring abilities, improve the reaction speed to external changes, and avoid conflicts and difficulties in the decision-making process.

Furthermore, changes in the business environment are often associated with adjustments in the overall corporate strategy (Hillman, Cannella, & Paetzold, 2000, p.242). Since the board of directors intervenes in strategy formulation, it is involved in any significant strategy change to adapt to the external environment (Tushman & Romanelli, 1985). As mentioned earlier, the resource dependence theory supports that each company must keep up with the changes in the external environment to succeed. Therefore, the board's composition in terms of demographic or task-related characteristics may necessitate strategic alterations to keep transaction costs low and reap the benefits of enhanced communication channels, facilitating the company's strategic change (Pfeffer & Salancik, 1978).

Finally, each country's social, political, and economic structures can determine the level of board diversification. Naming Norway and Iceland as examples, Terjesen and Singh (2008, p.58) argue that if a country strongly embraces female representation in legislative and senior positions, this might influence society's beliefs about the management qualifications of women, thereby enhancing gender diversity in the boards. Additionally, in such states, the question of the general equality in opportunities is more likely to be on the political agenda, meaning that boardrooms may depict greater diversity on further dimensions other than gender, too. Lastly, the new corporate governance rulings also define corporate diversity, since depending on the country, they either compel or suggest the improvement of the share of underrepresented board directors (Terjesen et al., 2009).

2.5. Effects of Board Diversity

2.5.1. Effects on Firm Performance

Generally, boardrooms have at least four crucial functions: monitoring managers, providing information and counsel to principals, monitoring compliance regulations, and linking the corporation to its external environment (Monks & Minow, 2004). One basic proposition in the literature is that the boards' composition and diversity might affect how boards fulfil these functions, which are vital to determine firm performance (Carter et al., 2010).

The existing theoretical framework on the effects of board diversity on firm performance draws on various perspectives. According to the *agency theory*, for example, since the board of directors is a critical tool to monitor managers and mitigate conflicts between them and the shareholders (Fama & Jensen, 1983), an appropriate diversity level could enhance its monitoring role (Kandel & Lazear, 1992). Yet, Carter et al. (2003, p.37) argue that the agency theory alone cannot predict the effect of diversity since diverse boards may be marginalised, negatively affecting the monitoring outcome and, thereby, firm performance.

The *resource dependence theory* also plays a central role when analysing the impact of board diversity (Carter et al., 2010). The directors' established linkages provide the board with legitimacy and communication channels, aiming to reduce its dependence on external factors (Pfeffer & Salancik, 1978). Board members, for instance, could expand their networks, which in turn might enable firms to benefit from the improved access to their constituents (Hillman et al., 2000, p.239). The *human capital theory* complements this perspective, as directors with different backgrounds, skills, and experience provide their unique human capital to the boardroom, potentially enhancing firm performance (Becker, 1976).

In contrast, boardroom diversity may also hamper firm performance. Based on the *similarity-attraction paradigm*, the society perceives other individuals as "outsiders" when they differ from the main group (Byrne, 1971). In such cases, people might be reluctant to share information with them, leading to an interpersonal breakdown (Adams, Hermalin, & Weisbach, 2010). Extrapolating these thoughts to boardrooms, the *social psychology theories* propound that diverse cognitive abilities and perspectives can generate conflicts among groups that are similar in other traits (Williams & O'Reilly III, 1998). This, in turn, is likely to impede the board's cohesiveness and communication, protract decision-making, and diminish firm performance (Westphal & Bednar, 2005).

Moving from theory to praxis, the board diversity effects on firm performance have also been evaluated in empirical frameworks. In such literature, the attention is mostly on gender diversity, possibly due to data availability and the recently enforced gender quota regulations (Carter et al., 2010, p.397). Despite the vast number of studies, the empirical results are not unanimous, as some researchers proclaim a positive effect of gender diversity on firm profitability (Erhardt et al., 2003), firm value (Carter et al., 2010; Gordini & Rancati, 2017), and monitoring efficiency (Adams & Ferreira, 2009); however, other studies show a negative connection between gender diversity and the firm's gross profit and ROE (Haslam, Ryan, Kulich, Trojanowski, & Atkins, 2010) or even no statistical significance (Farrell & Hersch, 2005; Rose, Munch-Madsen, & Funch, 2013; N. Smith, Smith, & Verner, 2006). Rose (2007, p.411) explains that the negative results can be caused due to the process of socialisation where the unconventional board members, such as female directors and other board "minorities", must first adopt the behaviour and norms of the regular board members, thereby delaying the firm's processes. However, some researchers still contend the positive influence of gender diversity on firm performance

using the *critical mass argument* (Arena et al., 2015), which asserts that a visible impact on financial performance is only possible with a certain number of individuals with different traits (Kanter, 1977).

As for the other demographic and cognitive diversity dimensions, similar binary results are observed. Different nationalities, age groups, et cetera might also have a positive (Carter et al., 2010), a negative (Hafsi & Turgut, 2013; Mahadeo, Soobaroyen, & Hanuman, 2012) or a statistically insignificant (Rose, 2007) impact on firm performance.

For instance, nationality diversity might cultivate a profusion of experience and knowledge of various economic and operational environments, which could intensify competitiveness, group dynamics, and the quality of corporate social responsibility (Johnson, Schnatterly, & Hill, 2013; Khan, Khan, & bin Saeed, 2019). It could also support the innovative solutions' formulation and the efficient solving of complex tasks, shaping profitability and general performance (Nielsen & Nielsen, 2013). Contrarywise, Delis, Gaganis, Hasan, and Pasiouras (2017) state that communication is usually facilitated if the group members share a common background, similar ideas, and perceptions. Thus, the increased cultural diversity in the boards might hamper the company's smooth functioning due to communication problems that arise from social or language barriers and the lack of a common past, as posited by the *social identity theory* (Dumas, Phillips, & Rothbard, 2013; K. G. Smith et al., 1994).

Concerning educational diversity, most researchers uphold a positive influence on firm performance, as the conglomeration of different educational levels prompts various knowledge, ideas, and viewpoints, possibly resulting in better decisions and, thus, corporate performance (Bantel, 1993a; Kim & Lim, 2010). Nevertheless, Milliken and Martins (1996) find a negative influence, as board members with distinct educational backgrounds might also perceive, process, and respond to the issues they confront differently, resulting in a greater possibility of cognitive conflicts that hamper the firm's efficiency.

Finally, Kim and Lim (2010) and Mahadeo et al. (2012) signal the importance of age diversity for firm performance, as they highlight possible synergies between the younger board members' productivity and the experience of older ones.

To conclude, the empirical results are mixed, and as suggested by Adams and Ferreira (2009), the impact of board diversity on firm performance is likely to be heterogeneous. While some large companies might benefit from the enhanced diversity because they have more complex structures and need intensive monitoring stemming from different experiences, other companies might be harmed from this overmonitoring and the slacked in-board communication.

2.5.2. Effects on Firm Risk

From a theoretic perspective, the *upper echelons theory* (Hambrick & Mason, 1984) implies that the characteristics of executives are reflected in the firm's business strategies and performance outcomes (Bertrand & Schoar, 2003), and the diversity of the individuals' traits signifies corporate risk-taking decisions (Sila, Gonzalez, & Hagendorff, 2016). On the one hand, the preferences, incentives, and beliefs of homogenous groups could result in more idiosyncratic arrangements, as these groups pull less scrutiny within the board. This lack of internal governance would manifest itself in more volatile firm outcomes, arguing in favour of greater diversity in the boardrooms (Bernile et al., 2018). On the other hand, as discussed above, diversity might also trigger conflicts and disturb the board's decision-making process, making consensus harder and outcomes, such as firm risk, more unpredictable (Arrow, 1951).

From an empirical viewpoint, the negative relation between diverse boards and firm risk relies on the argument that such boards can enhance their monitoring and advisory role, helping the firm reduce risk in uncertain environments. Bhat, Chen, Jebran, and Memon (2019) examine the effects of diversified boards on risk considering both the relations- and task-oriented diversity dimensions in Chinese firms. They suggest that task-related diversity in terms of education and tenure could positively impact performance and alleviate risk more efficiently than demographic diversity. For instance, directors having diverse cognitive characteristics could make more effective decisions, reducing the chance to make suboptimal investments (Webber & Donahue, 2001). This view is also supported by Adams et al. (2015), as task-oriented diversity leads to moderated decisions and discipline. Nevertheless, Bhat et al. (2019, p.282) also stress that in the long run, the relations-oriented diversity is also vital in reducing corporate risk, as getting familiar with each other, board members can minimise communication problems. Another study conducted by Bernile et al. (2018) provides similar outcomes, analysing the relationship between general diversity (including gender, ethnicity, financial expertise, et cetera) and firm risk measured by the annual volatility of daily stock returns. The authors argue that board diversity smooths decision-making and eliminates problems related to groupthink.[2] In contrast, Coles, Daniel, and Naveen (2014) stress that diversity might actually generate groupthink if many board members are co-opted or have lengthier tenures since this may hinder the board's monitoring aspect and leave risk-moderation uncontrolled. Finally, Hambrick, Cho, and Chen (1996) also remain sceptical regarding the power of diversity to moderate risk, as greater diversity might lead to longer decision-making processes and reduce the firm's reaction speed, especially when the external environment is already volatile.

Disaggregating board diversity into its distinct traits, a growing number of studies has analysed the effect of gender on risk. A common conclusion is that female directors prefer lower risk in the financial decision-making process (Adams & Ferreira, 2009) and disclose more environment-

[2] *Groupthink* arises within a group of people who desire agreement or conformity at any cost, resulting, however, in unreasonable or dysfunctional decision-making (McCauley, 1989, p.251).

related information to avoid litigation issues (Liao, Luo, & Tang, 2015). Moreover, women are more conservative during investment decisions (Bernasek & Shwiff, 2001) and tend to hold less risky investment portfolios (Halko, Kaustia, & Alanko, 2012). The same conclusions regarding female risk aversion are also supported by Chen, Gramlich, and Houser (2017), as female directors are more cautious about firm reputational risks associated with aggressive tax strategies and generally avoid risky and challenging situations. However, Adams and Funk (2012) provide some opposite evidence and document that female directors concentrate more on stimulation and less on security, conformity, and tradition, tending to over-monitor and make riskier decisions than their male peers. This, in turn, decreases shareholder value (Ahern & Dittmar, 2012) and generates more firm-specific risks (Farag & Mallin, 2018). Finally, Berger, Kick, and Schaeck (2014) note that a higher presence of female board members results in less liquidity and more leverage in the firm's portfolio; however, when other diversity dimensions are also more starkly represented, portfolio risk is fairly mediated. The latter effect is explained by the fact that heterogeneous directors bear diverse experiences, allocating more time to portfolio selection and thereby, reducing risk.

In addition, other dimensions might also influence the board's risk-taking practices. Conventional wisdom, supported with empirical evidence, suggests that risk-taking appetite decreases with an individual's age (Campbell, 2006). Precisely, older managers tend to avoid high leverage and capital expenditures and to advocate higher cash holdings (Peltomäki, Sihvonen, Swidler, & Vähämaa, 2020, p.26) – practices that are not always chosen by younger directors (Davidson, Xie, Xu, & Ning, 2007). Moreover, concerning educational diversity, (Graham & Harvey, 2001, p.233) indicate that executives with a higher academic degree tend to use more sophisticated valuation techniques to assess and possibly, reduce corporate risk. As for the board's financial expertise diversity, financial experts have arguably lower costs in acquiring information on the environment's complexity and the associated transaction risks (Harris & Raviv, 2008; Minton, Taillard, & Williamson, 2014, p.352). Hence, they can recognise unprofitable risks more easily and advise senior executives against accepting them, as well as identify risks beneficial to shareholders and encourage executives to pursue them, increasing the shareholders' residual claims (Acharya, 2010).

To sum up, referring to the *contingency theory* (Fiedler, 1967), the discrepancy in the empirical results can be partially explained by the variations in the organisational environment in which risk-taking is considered. This theory implies that there is no universal management procedure to run an organisation, and management styles tend to be contingent on the environment's properties. This is why numerous studies report substantial differences when examining various diversity types (Saeed, Mukarram, & Belghitar, 2021).

2.5.3. Effects on Board Compensation

Next to the monitoring role, the supervisory board also approves the most important corporate decisions, such as recruitments or the design of the executives' payment packages (Monks & Minow, 2004). Thus, the managers' salary is affected by the efficiency of the board's supervision (Finkelstein, Hambrick, & Cannella, 1996).

On the one hand, according to the *optimal contracting theory*, the level of board diversity might influence its effectiveness, thereby enhancing its steering role (Adams & Ferreira, 2009), constraining managers from expropriating the shareholders' wealth avoiding overpayments (Stulz, 1988; Sarhan et al., 2019, p.767). On the other hand, the *managerial power hypothesis* suggests that close negotiations between a "weak" board member and a "strong" executive might lead to an inefficient executive compensation contract, increasing the agency problem (Bebchuk & Fried, 2004). Thus, more diverse board members may be perceived as tokens (Hillman et al., 2007; Ntim, 2015, p.173), meaning that corporate executives could easily influence the board's decisions, especially those related to their compensation structure (Sarhan et al., 2019, p.767).

Looking at the different diversity aspects, Adams and Ferreira (2009) investigate the role of gender diversity on the CEO's pay. The authors note that directors in gender-diversified boards receive higher equity-based compensations that provide more performance incentives. However, they find no statistical evidence regarding the impact of gender diversity on executive compensation, probably owing to the lower representation of women in the studied firms' compensation committees. Yet, Lucas-Pérez, Mínguez-Vera, Baixauli-Soler, Martín-Ugedo, and Sánchez-Marín (2015) and Benkraiem, Hamrouni, Lakhal, and Toumi (2017) conclude that as the presence of female directors positively affects the board's functioning, gender diversity might also improve the CEO compensation packages' design. This argument supports the idea that heterogeneous boards offer alternative perspectives that can improve the firm's strategic decision-making, which also includes the payment schemes (Milliken & Martins, 1996).

Additionally, as regards nationality diversity, a study of Scandinavian firms by Oxelheim and Randøy (2005) argues that this dimension has a significant positive effect on the CEOs' compensation. They suggest that a foreign board member representing their country's legislation could improve the incentive structure of the top management. Consequently, executives may be exposed to a clash between different corporate governance cultures, and the reconciliation of these systems could pose new challenges for them. For instance, this may raise the need for a new corporate language (Oxelheim et al., 1998), new reporting requirements or new investor-related activities (Useem, 1998), raising their pay. This higher CEO compensation could be seen as a risk premium for their increased duties due to the board's internationalisation (Oxelheim & Wihlborg, 1997).

Moreover, a positive relationship between foreign direc-

tors and executive compensation is also reported by Randøy and Nielsen (2002). The authors explain this correlation within the Scandinavian corporate context, where compensations are relatively low, and as such, when foreign managers from higher-paying countries, like the UK or the US, are employed, their salaries are adjusted upwards. The researchers stress that this channel does not imply that foreign directors are less monitored regarding their performance and compensation; on the contrary, it suggests that such directors might have more connections and be better able to employ competent chief executives.

2.5.4. Other Possible Effects

Board diversity influences many other aspects of the company as well, which are closely linked to firm performance and risk. To begin with, Bernile et al. (2018) review whether corporate financial and investment policies depend on board diversity and whether board diversity influences the corporate innovation. The authors contend that the policies adopted by diversified boards may be more stable and last longer. As discussed above, board diversity can shape firm volatility, meaning that policy corrections could be less frequent due to the reduced idiosyncrasy in the decision-making process, leading to more robust policies against shifting contingencies. Moreover, diverse boards tend to adopt more conventional financial policies, possibly including less risk, which reduce the dependence on firm debt and result in sustainably higher dividend yields for shareholders without harming the firm's organic growth (Bernile et al., 2018, p.602).

Furthermore, Bernile et al. (2018) argue that heterogeneous boards are more likely to invest in innovation projects that foster firm growth, even though R&D investments are typically riskier. This focus on innovation can be explained by the fact that such boards prefer more prudent risk-taking via the original concepts' promotion (Hoffman & Maier, 1961). There are also indications that board diversity positively influences the quantity and the quality of the firm's innovation output, measured by the number of patents or the ratio of patents to R&D expenses. Bearing in mind the board's advisory role, higher diversity could ex ante lead to a more efficient allocation of the firm's R&D resources. Specifically, diversity could promote more efficient monitoring of the firm's budget and resource allocation to more promising innovation areas (Bernile et al., 2018, p.603). Moreover, the *management theory* asserts that more diverse boards could positively shape corporate innovation practices through their impact on corporate culture (Griffin, Li, & Xu, 2021, p.127), as minority members of diverse boardrooms are more likely to challenge tradition, question the status quo, and inspire the majority members to adopt new perspectives (Johnson, van de Schoot, Delmar, & Crano, 2015, p.582). Lastly, board diversity generally fosters a diversity-friendly culture in the firm, thereby increasing the workforce's heterogeneity, which is essential for the firm's innovation process (Gao & Zhang, 2014).

Finally, Tarus and Aime (2014) examine the impact of board diversity on the firm's strategic change activities. Since the board is responsible for shaping the corporate strategic direction and reviewing progress in its implementation, the authors argue that different demographic and cognitive diversity characteristics might influence the firm's strategic change, defined as the change of the firm's resource allocation pattern. Next to the arguments outlined above, the authors add that younger people, having a fresher educational background, are more likely to expend more physical and mental effort on supporting the change and growth of their firms. Moreover, educational and functional diversity might help the boards spot environmental opportunities, and search and process comprehensive information more efficiently, translating them into viable strategies and ideas, and expanding the probability of accepting strategic change (Hambrick & Mason, 1984).

3. Descriptive Analysis of Diversity Trends in Germany

3.1. Data Description and Methodology

After the extensive literature review concerning the possible determinants and effects of board diversity, the focus moves to the central subject of this thesis, namely the board diversity trends in Germany. To analyse such trends in supervisory and executive boards, I use the BoardEx databank to raise data on all German listed firms from 1998 to 2020. To construct the different board diversity indices, I use information from two separate datasets: the first one (henceforth Main Set) includes the directors' general traits, such as their gender, birthday, corporate title, and the number of simultaneous board tenures, and the second one (henceforth Auxiliary Set) comprises information on their academic degrees, the award date, and their university affiliation.

To conduct the study, I use the STATA software, considering only observations from 1999 to 2019, as the years 1998 and 2020 consist of a small sample of firms, damaging cross-year comparability and precision. Furthermore, I drop companies with a foreign ISIN number to ensure that the trends focus only on firms that abide by the German corporate standards. Moreover, I exclude observations where the executive or supervisory boards consist of only one person, as such boards are homogenous per definition and can distort the trends.

Since diversity has various facets, and its dimensions may describe either demographic or cognitive differences among individuals (Williams & O'Reilly III, 1998), in my analysis, similar to Bernile et al. (2018), the main variables of interest are the gender, nationality, and age of board members, representing demographic attributes, as well as their financial expertise, the number of additional board tenures, and the institution, where each person received her latest academic degree, which provide information on the directors' cognitive characteristics.

While studying the diversification trends, it is essential to identify whether a specific diversity dimension has a more prominent driving force for the overall trend. Therefore, I proceed by studying three different levels of diversity. First, I

observe the overall diversity, which considers all six traits simultaneously for each board type (supervisory, executive or combined boards), following Bernile et al. (2018) in *Section 3.1.1*.[3] Then, I isolate the demographic and cognitive trends by constructing indices explained in *Section 3.1.2*, and lastly, I consider each dimension separately to identify their noteworthy trends. Depending on the level of aggregation, I employ different restrictions to exclude missing values. The analysis of the overall diversity comprises 15,129 observations for the supervisory boards, 6,100 for the executives, and 22,670 for the combined ones. *Appendix A* provides the total number of observations for each disaggregated study.

The variables for gender and nationality already exist in the dataset and are employed directly. To identify each board member's age, I build the difference between this person's birth year and the respective fiscal year for each tenure. To eliminate extreme outliers, distorting the trends, I winsorise the age variable at the 1% level. For the financial expertise dimension, I create a binary variable that takes the value one if a director is a financial expert. To do so, I consider each board member's role, looking for any keyword that could denote financial proficiency. For example, I identify a financial expert if they have a role description that includes terms like "CFO", "Risk", or the letter sequence "Fin".[4] Moreover, to study the number of other boards in which a board member sits simultaneously, I also construct a new variable. As the dataset contains the total number of boards on which each director serves each year, I subtract one board to consider only the *additional* board incumbencies.

Finally, for the educational diversity, I conduct several steps to prepare the variable of interest, which is the directors most recent university attendance. Following Bernile et al. (2018), I consider the institution where each member graduated as a proxy for education, but since many directors have attended multiple courses, I believe it is crucial to consider the latest university affiliation available in each reporting year. Specifically, I advocate that each university conveys a certain mentality to its students and that these experiences might influence the directors' mindset, work attitude, and extent of knowledge that they use in their job. Assuming that the most recently conveyed mentality probably has the most vivid effect on the director's perspectives, I use the latest university attendance as a proxy for educational diversity. To create this measure, firstly, I prepare the Auxiliary Set. Many board members have attained multiple degrees in the same year, and so I only keep the highest one. Moreover, in the Main Set, the oldest report year is 1999, and so if a director has several degrees attained before 1999, I keep the latest one. If a director, for example, has two degrees, one in 1970 and one in 1990, I only keep the one in 1990. If a director has a degree in 1990 and one in 2005, I keep both, and so, I undertake more steps to ensure that they are allocated correctly to the respective board years. The Auxiliary and the Main Set are joined together by each director's ID, and so, in each year, in each firm, each director receives all their degrees, meaning that duplicates can emerge. Thus, I drop all duplicates where the degree's award year is later than the respective report year, eliminating false joints. If all degrees are acquired before the report year, I only keep the latest one, according to my argumentation line above. For example, if a director has two degrees, one in 1990 and one in 2005, and the report year is 2000, only the 1990-degree is relevant. Yet, in 2010, both degrees are valid, but I only keep the one in 2005. Hence, each director receives the most recent university affiliation available in each year.

3.1.1. Board Diversity Index following Bernile et al. (2018)

To analyse the overall board diversity, similar to Bernile et al. (2018), I construct an analogous diversity index, considering all six dimensions. Following the authors, to compute the board diversity index, I calculate for each board-year observation the fraction of female directors (PCT_FEMALE), the mean number of other boards on which current members serve (NUM_BOARDS), the standard deviation of the directors' age (STDEV_AGE), and the Herfindahl–Hirschman Indices (henceforth HHI) of nationality (HHI_NATIONALITY), the most recent university affiliation (HHI_UNIVERSITY), and the binary variable for financial expertise (HHI_FINEXPERT). The authors favour the standard deviation of age over the HHI based on different age groups, as this approach does not cause mechanical changes in age diversity due to natural ageing.

Additionally, the authors use the HHI to compute the diversity level, as this is a standard method to measure the concentration within a specific group of observations, such as a board of directors. The standard HHI is defined as the sum of the squares of different group shares within the whole group, as showed in *Equation* 1:

$$HHI = \sum_{i=1}^{N} \left(s_i^2\right), \quad HHI \in \left[\frac{1}{N}; 1\right] \tag{1}$$

where s_i is the share of each category i, and N is the number of categories within a specific dimension. The HHI's value is limited between $\frac{1}{N}$ and one, where one indicates group homogeneity and $\frac{1}{N}$ perfect heterogeneity (Fahrmeir, Heumann, Künstler, Pigeot, & Tutz, 2016, pp. 79-80).[5]

Finally, the authors standardise each diversity attribute over the entire timespan to make their scales comparable and observe whether the diversity is above or below the average value of the 21-year-period. As Bernile et al. (2018) argue, each diversity component has equal importance for the final BOARD_DIVERSITY_INDEX in each board-year, presented in

[3] The term *combined boards* refers to the consideration of the supervisory and executive boards as if they were one boardroom, subject to the same sample restrictions. Thus, the results for the combined boards presented in the following sections do not necessarily average the diversity trends of the supervisory and executive boards, as the indices are computed anew over a larger board size.

[4] All relevant keywords are in *Appendix B*.

[5] Examples for the calculation of the HHI-based measures, as well as an extensive overview of all diversity measures can be found in *Appendix B*.

Equation (2), which is why I ensure that there are no missing values for any of the relevant variables when building the index.

$$\begin{aligned} BOARD\_DIVERSITY\_INDEX \\ &= STDZ(PCT\_FEMALE) \\ &+ STDZ(STDEV\_AGE) \\ &+ STDZ(NUM\_BOARDS) \\ &- STDZ(HHI\_NATIONALITY) \\ &- STDZ(HHI\_UNIVERSITY) \\ &- STDZ(HHI\_FINEXPERT) \end{aligned} \tag{2}$$

The authors propound to subtract HHI-based measures because, per definition, higher values reflect a higher concentration of the corresponding attribute in the board and, so, lower diversity. Thus, the higher the value of the board diversity index, the higher the diversity in the board.

3.1.2. Description of Other Variables

For the separate cognitive and demographic diversity trends' analysis, I follow the same steps, distinguishing between demographic attributes (gender, age, nationality) and cognitive traits (board tenure, financial expertise, most recent university affiliation). Thus, for each board-year, I observe either the fraction of female board members, the variance in age, and the HHI of nationality, or the mean number of additional boards and the HHIs of university and financial proficiency, as shown in *Equations* (3) and (4):

$$\begin{aligned} BOARD\_DEMOGRAPHIC\_DIVERSITY\_INDEX \\ = STDZ(PCT\_FEMALE) + STDZ(STDEV\_AGE) \\ - STDZ(HHI\_NATIONALITY) \end{aligned} \tag{3}$$

$$\begin{aligned} BOARD\_COGNITIVE\_DIVERSITY\_INDEX \\ = STDZ(NUM\_BOARDS) - STDZ(HHI\_UNIVERSITY) \\ - STDZ(HHI\_FINEXPERT) \end{aligned} \tag{4}$$

Lastly, it is also vital to analyse the trend of each attribute separately to identify whether any dimension is a more prominent diversity driver. For this final study, I conduct the same data preparation as before; however, I observe one trait at a time, eliminating missing values only for this dimension. In addition, I do not standardise the values, as I do not have to compare or combine them. Lastly, for the components where HHI was previously used, I employ the Blau's Index to make the diversity development more illustrative. The only difference between the two indices is that the Blau's Index is a transformation of the HHI, namely $1 - HHI$, and so higher values indicate greater diversity (Blau, 1977). The corresponding equation for each disaggregated diversity dimension in each board-year is shown below. The percentage of female board members, average number of board tenures, and the standard deviation of age remain the same.

$$BLAUS\_INDEX\_NATIONALITY = 1 - \sum_{n=1}^{N} s_n^2 \tag{5}$$

$$BLAUS\_INDEX\_UNIVERSITY = 1 - \sum_{u=1}^{N} s_u^2 \tag{6}$$

$$BLAUS\_INDEX\_FINEXPERT = 1 - \sum_{f=1}^{N} s_f^2 \tag{7}$$

3.2. Diversity Trends in Germany

3.2.1. Board Diversity Trends

To exhibit the trends, I present the computed values of the overall BOARD_DIVERSITY_INDEX in *Table* and *Figure* 1, averaging each index over all boards for each year. Studying German executive and supervisory boards combined, many companies tried to promote diversity in their boards from 1999 until 2002. Nevertheless, from 2003 until 2011, the diversity index gradually decreased, meaning that boards were becoming more homogeneous. Especially, from 2004 to 2012, the index is negative, indicating that the level of diversity was below average when considering the 21-year-span. Then, however, recognising the boards' diversification importance, companies strove to increase diversity until 2013. The years 2014 and 2015 present general negative board diversification trends, followed by an increase between 2015 and 2016. The years 2017 and 2018 were highlighted by a relative decrease in the heterogeneity of the directors' traits, which was, however, short-lived, as an increasing diversity trend can be observed since 2018.

When separating German supervisory and executive boards, similar conclusions emerge. The German supervisory boards' analysis mainly indicates a slight increase in the overall diversity in the first three years of the observed period. Next, a continuous decreasing trend of diversity can be identified until 2010. After this, the shareholders probably started attending who represents their interests and monitors business processes in firms, which also influenced the increase in the overall supervisory board diversity. However, until 2012, the index was continuously negative, indicating that the diversity levels were below the 21-year-average. Between 2013 and 2014, there was anew a sharp decrease in the board diversification, but an even more notable increase followed this until 2019.

As for the German executive boards, from 1999 until 2001, they experienced an increase in their overall heterogeneity. However, from 2002 until 2010, the diversity trend in the boardrooms was mainly downward, with sporadic short-term increases. Nevertheless, similarly to the diversity trend in the supervisory boards, the year 2010 was the board diversification strategy's turning point, marking a progressive increase until 2013. Afterwards, a short-term board heterogeneity decrease followed until 2015, but since then, board diversity has been rising uninterruptedly, also being above the 21-year-average since 2016.

Table 1: Board Diversity Index

Combined Boards	**1999**	**2000**	**2001**	**2002**	**2003**	**2004**	**2005**	**2006**	**2007**	**2008**	**2009**
	-0.50	-0.30	0.01	0.28	0.05	-0.07	-0.09	-0.08	-0.10	-0.19	-0.06
	2010	**2011**	**2012**	**2013**	**2014**	**2015**	**2016**	**2017**	**2018**	**2019**	
	-0.03	-0.20	-0.02	0.07	-0.10	-0.15	0.14	0.09	0.11	0.56	
Supervisory Boards	**1999**	**2000**	**2001**	**2002**	**2003**	**2004**	**2005**	**2006**	**2007**	**2008**	**2009**
	-0.36	-0.29	0.02	-0.05	-0.12	-0.13	-0.23	-0.26	-0.12	-0.45	-0.45
	2010	**2011**	**2012**	**2013**	**2014**	**2015**	**2016**	**2017**	**2018**	**2019**	
	-0.55	-0.30	-0.16	0.04	-0.04	0.06	0.29	0.41	0.45	0.71	
Executive Boards	**1999**	**2000**	**2001**	**2002**	**2003**	**2004**	**2005**	**2006**	**2007**	**2008**	**2009**
	-0.23	0.22	0.39	0.34	0.09	0.24	0.06	-0.13	-0.16	-0.44	-0.33
	2010	**2011**	**2012**	**2013**	**2014**	**2015**	**2016**	**2017**	**2018**	**2019**	
	-0.47	-0.32	-0.08	0.25	0.14	-0.28	0.02	0.05	0.30	0.43	

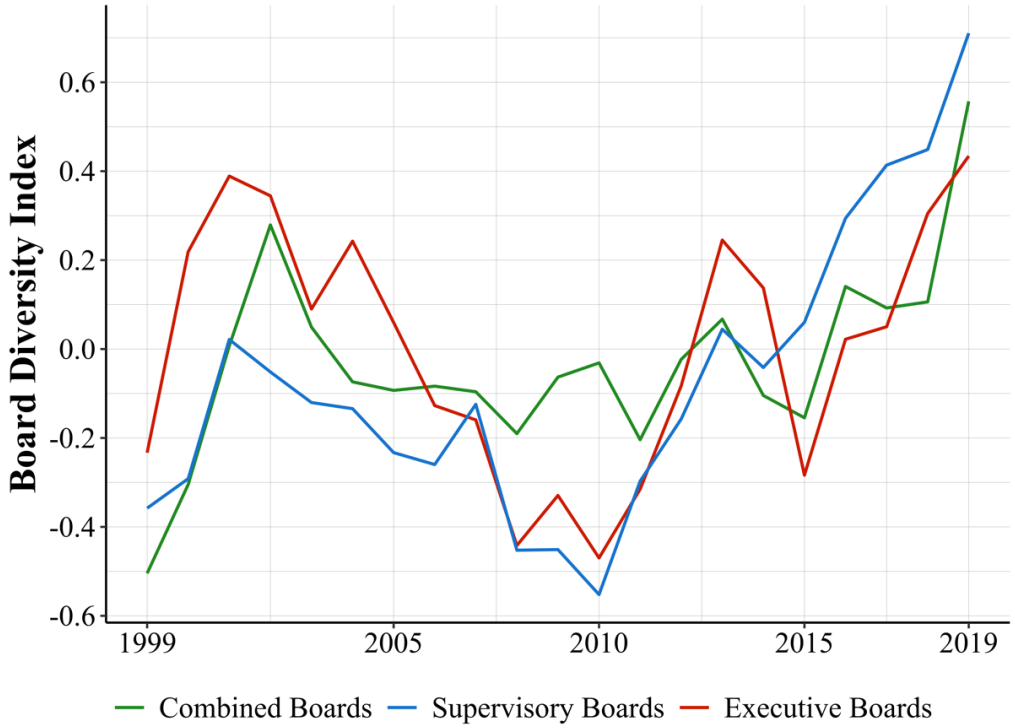

Figure 1: Board Diversity Index

Notes. The table and the figure present the development of board diversity in German listed companies. The Board Diversity Index is computed using data on gender, age, nationality, financial expertise, university affiliation, and the number of other board tenures, following Bernile et al. (2018). All components are standardised over the entire period so that the computed Board Diversity Index could provide information regarding the yearly diversity level relative to other years. Thus, the negative values mean that the diversity in this particular year is below the 21-year-average. All values in the table are rounded to two decimals, but the graph is plotted with higher decimal-precision.

3.2.2. Demographic and Cognitive Diversity Trends

After examining the overall board diversity trends, it is interesting to see what drives these tendencies and whether there are any visible differences between the developments of the demographic and cognitive diversity dimensions. *Table* and *Figure* 2 present these trends for German firms at the separate level.

Starting with the cognitive diversity, it is evident that the trend could be characterised by a general decrease, and since 2010, the level of cognitive diversity has remained under its 21-year-mean. The firms tended to have comparably heterogeneous boards at the beginning of the 21st century; however, after 2002, the combined boards started evincing more homogeneity regarding their cognitive traits. Despite some short-term fluctuations between 2011 and 2016, the negative trend has persisted.

The decreasing cognitive diversity trend can be identified for German supervisory boards, too, as board members have

Table 2: Cognitive and Demographic Board Diversity Indices

Cognitive Board Diversity Index											
	1999	**2000**	**2001**	**2002**	**2003**	**2004**	**2005**	**2006**	**2007**	**2008**	**2009**
Combined Boards	0.83	0.97	0.96	0.97	0.84	0.73	0.47	0.33	0.14	0.04	0.03
	2010	**2011**	**2012**	**2013**	**2014**	**2015**	**2016**	**2017**	**2018**	**2019**	
	-0.05	-0.27	-0.25	-0.19	-0.18	-0.32	-0.26	-0.32	-0.37	-0.25	
	1999	**2000**	**2001**	**2002**	**2003**	**2004**	**2005**	**2006**	**2007**	**2008**	**2009**
Supervisory Boards	1.08	1.20	1.07	0.87	0.75	0.79	0.48	0.48	0.26	0.15	0.03
	2010	**2011**	**2012**	**2013**	**2014**	**2015**	**2016**	**2017**	**2018**	**2019**	
	-0.10	-0.37	-0.38	-0.22	-0.17	-0.23	-0.27	-0.35	-0.41	-0.31	
	1999	**2000**	**2001**	**2002**	**2003**	**2004**	**2005**	**2006**	**2007**	**2008**	**2009**
Executive Boards	0.46	0.75	0.74	0.66	0.41	0.50	0.12	0.04	0.00	-0.16	-0.02
	2010	**2011**	**2012**	**2013**	**2014**	**2015**	**2016**	**2017**	**2018**	**2019**	
	-0.14	-0.17	-0.11	-0.03	-0.15	-0.26	-0.13	-0.19	-0.28	-0.15	
Demographic Board Diversity Index											
	1999	**2000**	**2001**	**2002**	**2003**	**2004**	**2005**	**2006**	**2007**	**2008**	**2009**
Combined Boards	-0.76	-0.69	-0.65	-0.57	-0.60	-0.63	-0.54	-0.43	-0.36	-0.21	-0.15
	2010	**2011**	**2012**	**2013**	**2014**	**2015**	**2016**	**2017**	**2018**	**2019**	
	-0.16	-0.06	0.20	0.29	0.17	0.19	0.40	0.45	0.53	0.59	
	1999	**2000**	**2001**	**2002**	**2003**	**2004**	**2005**	**2006**	**2007**	**2008**	**2009**
Supervisory Boards	-0.74	-0.68	-0.73	-0.73	-0.81	-0.79	-0.74	-0.68	-0.51	-0.41	-0.32
	2010	**2011**	**2012**	**2013**	**2014**	**2015**	**2016**	**2017**	**2018**	**2019**	
	-0.33	0.01	0.31	0.38	0.25	0.36	0.53	0.67	0.74	0.77	
	1999	**2000**	**2001**	**2002**	**2003**	**2004**	**2005**	**2006**	**2007**	**2008**	**2009**
Executive Boards	-0.21	-0.07	-0.08	-0.01	-0.05	-0.03	0.01	-0.11	-0.12	-0.06	-0.03
	2010	**2011**	**2012**	**2013**	**2014**	**2015**	**2016**	**2017**	**2018**	**2019**	
	-0.05	-0.15	-0.07	0.00	0.00	-0.14	0.12	0.24	0.36	0.28	

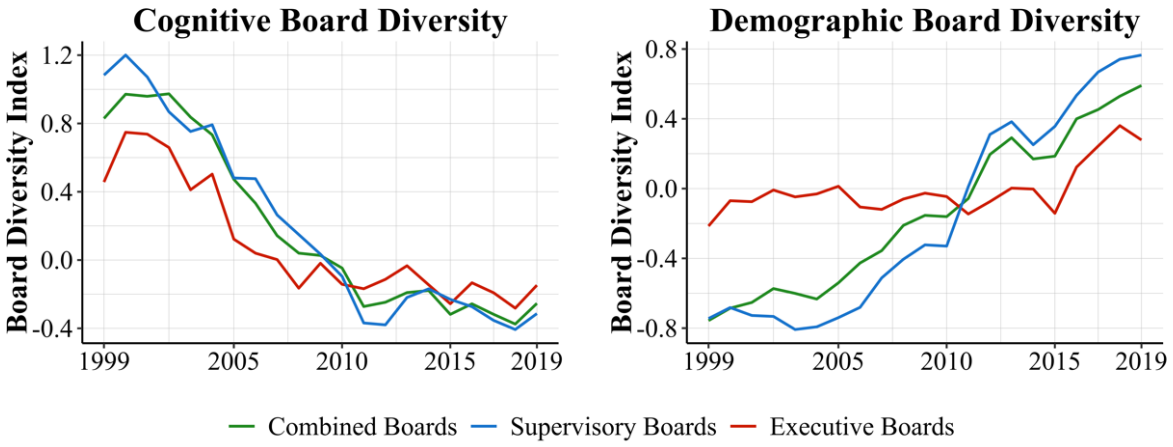

Figure 2: Cognitive and Demographic Board Diversity Indices

Notes. The tables and the figures present the development of the disaggregated cognitive and demographic board diversity characteristics in German listed companies. The Cognitive Board Diversity Index is computed using data on financial expertise, university affiliation, and the number of other board tenures; the Demographic Board Diversity Index is computed using the information regarding gender, age, and nationality of the board members, following Bernile et al. (2018). All components are standardised over the entire period so that both Board Diversity Indices could provide information regarding the yearly diversity level relative to other years. Thus, the negative values mean that the diversity in this particular year is below the 21-year-average. All values in the tables are rounded to two decimals, but the graphs are plotted with higher decimal-precision. The number of observations for each board diversity study is presented in *Appendix A*.

become less diverse in terms of their cognitive characteristics over the years. Between 2001 and 2012, this decline was also almost monotonous. Moreover, from 2012 to 2014, there were some attempts to increase board diversity, but these were probably not successful as the declining trend appeared again, lasting until 2018.

A similar trend can also be identified for the executive boardrooms. Diversity among executives was falling sharply until 2008, and this negative trend continued afterwards as well, albeit with a flatter slope. Since 2007, the level of diversity has also been constantly below the 21-year-average.

Switching to the demographic attributes, a definite positive trend can be noticed over the last 20 years for the combined boards, as they tended to become more heterogeneous regarding their members' gender, age, and nationality, and since 2012 the level of demographic board diversity is over its 21-year-average. Nevertheless, three time periods can be described as short-term exceptions, as the years 2002 to 2004, 2009 to 2010, and 2013 to 2014 represent minor decreases in the boardrooms' composition dissimilarity.

Similar positive trends can also be identified when studying German supervisory boards. Even though at the turn of the millennium, demographic board diversity was falling in such boards, an upward trend prevailed in 2003, and since then, only two modest declines have been noted in the years 2009 to 2010 and 2013 to 2014.

Lastly, as regards executive boards, the demographic diversity trend is not that prominent. These boards experienced systematic fluctuations until 2015, and thus, no clear trend can be identified. However, since 2015, there has been an increase in demographic heterogeneity, and the diversity level has been steadily above average since 2016.

3.2.3. Trends in Individual Diversity Categories

After discovering that it is rather demographic diversity that drives the overall diversity trends in German boardrooms, it is essential to learn the tendencies of each component of the BOARD_DIVERSITY_INDEX over time. Gender board diversification, being probably the most studied characteristic in the literature, could be seen as one of the most prominent examples of an upward trend, as presented in *Table* and *Figure* 3. At the combined boards level, one can observe a gradual positive trend until 2010, and then a sharp increase in female board representation. Similarly, studying the supervisory boards, the trend has had an overall rising character since 2002 and after 2015, there is an even more evident positive trend, which can be explained with the Gender Quota Act enacted by the government in 2016. In the executive boards, the trend is, however, not that explicit. While the overall tendency of the women fraction in the boards has a positive inclination, this development is rather S-shaped, with fluctuation ranging between almost identical maximum and minimum values.

A similar overall positive trend can be observed for nationality diversity. With some short-term exceptions, the combined, executive, and supervisory boards have been increasing hiring people from abroad, probably trying to capture the diversity benefits, discussed in *Section 2.5*.

The age diversity trends presented in *Table* and *Figure* 4 provide evidence that the combined boardrooms are becoming more age homogeneous over time. After 2006, when a weak positive trend is observed, the board's age heterogeneity has started declining, reaching its minimum in 2019. Similarly, the supervisory boards also present a negative trend regarding age diversity. The period between 2003 and 2008 can be described as the only relatively long-term positive trend in age deviations, followed, however, by a noticeable declining tendency until 2019. For executive boards, the decline had already started in 2002. Additionally, in the executive boardrooms the standard deviation of age is also smaller than in the other boards, meaning that the overall age structure of the supervisory boards is more heterogeneous than this in the executive boardrooms.

As for the separate analysis of the cognitive diversity attributes, one can observe that the individual's university affiliation has a negative diversity trend over the observed period in all board types, as presented in *Table* and *Figure* 5. Nevertheless, it is worth noting that the education diversity values have remained very high in supervisory boards despite the decreasing character. Interestingly, board diversity regarding financial expertise, which is also presented in *Figure* 5, has a positive trend at the combined, supervisory, and executive board levels over the entire period.

Finally, a clear negative trend can also be identified when studying the diversity regarding the average directors' board incumbencies in Table and Figure 6. While the average number of additional boards in which a board member serves was close to one, during the last decade, this number decreased significantly afterwards, indicating that nowadays, most board members do not serve on multiple boards at the same time. This, in turn, can be understood as a decrease in the board experience, an aspect that may be critical while accomplishing the board duties, but also as a possible reduction of the groupthink effect, as discussed in *Section 2.5*.

4. Discussion of the Results

Studying the trends, one can discern that while some diversity dimensions demonstrate clear upward trends in German corporations, some other dimensions have become even more homogeneous over time. One must note that the German corporate governance regulation regarding the gender quota has undoubtedly affected the diversity trends since 2016, as illustrated in *Section 3.2*. As already discussed, one diversity attribute might impact the heterogeneity of other dimensions, which could be seen in the trends of the nationality and financial expertise dimensions, as I believe that they behaved similar to the gender diversity trends over the last years. Nevertheless, it is also prominent that the age and education diversity among board members has negative trends, meaning that regardless of gender, nationality or functional background, the boards tend to become homogeneous in these two dimensions. This, however, might affect the whole

Table 3: Gender and Nationality Board Diversity

Gender Board Diversity											
	1999	**2000**	**2001**	**2002**	**2003**	**2004**	**2005**	**2006**	**2007**	**2008**	**2009**
Combined Boards	0.07	0.07	0.06	0.07	0.07	0.08	0.07	0.06	0.06	0.06	0.06
	2010	**2011**	**2012**	**2013**	**2014**	**2015**	**2016**	**2017**	**2018**	**2019**	
	0.06	0.07	0.10	0.10	0.11	0.13	0.14	0.15	0.15	0.16	
	1999	**2000**	**2001**	**2002**	**2003**	**2004**	**2005**	**2006**	**2007**	**2008**	**2009**
Supervisory Boards	0.09	0.08	0.08	0.08	0.09	0.09	0.09	0.08	0.08	0.08	0.08
	2010	**2011**	**2012**	**2013**	**2014**	**2015**	**2016**	**2017**	**2018**	**2019**	
	0.08	0.09	0.11	0.12	0.13	0.15	0.18	0.18	0.19	0.20	
	1999	**2000**	**2001**	**2002**	**2003**	**2004**	**2005**	**2006**	**2007**	**2008**	**2009**
Executive Boards	0.02	0.02	0.02	0.02	0.02	0.03	0.02	0.02	0.02	0.02	0.02
	2010	**2011**	**2012**	**2013**	**2014**	**2015**	**2016**	**2017**	**2018**	**2019**	
	0.02	0.02	0.05	0.05	0.05	0.05	0.06	0.05	0.06	0.06	
Nationality Board Diversity											
	1999	**2000**	**2001**	**2002**	**2003**	**2004**	**2005**	**2006**	**2007**	**2008**	**2009**
Combined Boards	0.13	0.13	0.14	0.14	0.13	0.13	0.14	0.16	0.18	0.20	0.21
	2010	**2011**	**2012**	**2013**	**2014**	**2015**	**2016**	**2017**	**2018**	**2019**	
	0.22	0.22	0.24	0.24	0.23	0.24	0.24	0.25	0.26	0.25	
	1999	**2000**	**2001**	**2002**	**2003**	**2004**	**2005**	**2006**	**2007**	**2008**	**2009**
Supervisory Boards	0.11	0.11	0.12	0.12	0.11	0.11	0.12	0.13	0.17	0.18	0.19
	2010	**2011**	**2012**	**2013**	**2014**	**2015**	**2016**	**2017**	**2018**	**2019**	
	0.19	0.20	0.23	0.22	0.21	0.22	0.22	0.23	0.24	0.24	
	1999	**2000**	**2001**	**2002**	**2003**	**2004**	**2005**	**2006**	**2007**	**2008**	**2009**
Executive Boards	0.12	0.13	0.14	0.13	0.14	0.14	0.13	0.15	0.17	0.18	0.18
	2010	**2011**	**2012**	**2013**	**2014**	**2015**	**2016**	**2017**	**2018**	**2019**	
	0.19	0.17	0.19	0.19	0.19	0.19	0.19	0.20	0.22	0.22	

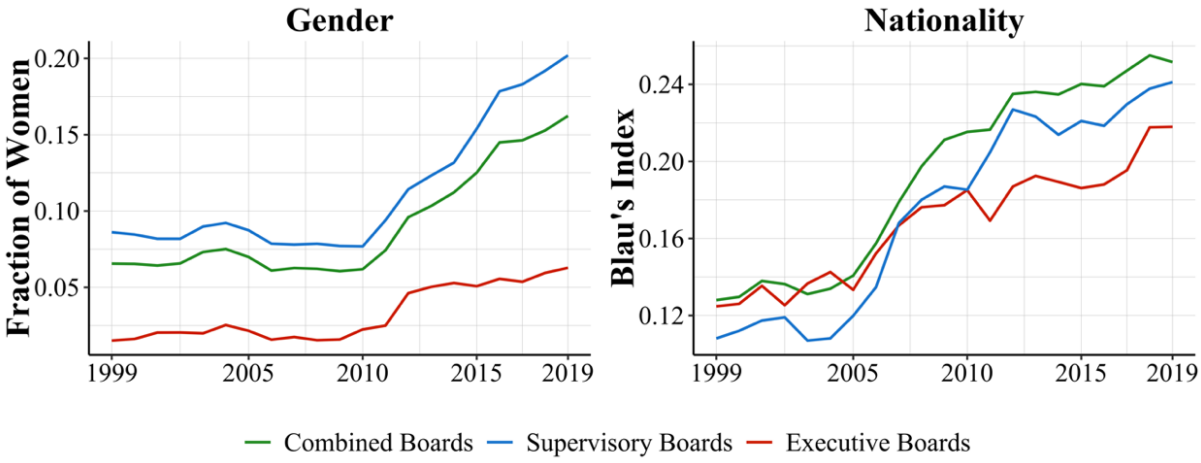

Figure 3: Gender and Nationality Board Diversity

Notes. The tables and the figures present the development of the separate gender and nationality diversity characteristics in German listed companies. The Gender Board Diversity represents the fraction of female board members relative to the number of all board members in each observed firm; the Nationality Diversity Blau's Index is computed using the information regarding the board members' nationality (Blau, 1977). All values in the tables are rounded to two decimals, but the graphs are plotted with higher decimal-precision. The number of observations for each board diversity study is presented in *Appendix A*.

boards' function and decision-making process, as many ideas and board rulings could be examined from a limited number of perspectives. Along the same argumentation lines as in *Section 2.5*, since differences in the board members' age and educational background might have positive impacts on firm performance and especially on risk appetite and risk exami-

Table 4: Standard Deviation of Board Members' Age

Combined Boards	**1999**	**2000**	**2001**	**2002**	**2003**	**2004**	**2005**	**2006**	**2007**	**2008**	**2009**
	8.45	8.60	8.46	8.70	8.74	8.65	8.72	8.92	8.81	8.77	8.63
	2010	**2011**	**2012**	**2013**	**2014**	**2015**	**2016**	**2017**	**2018**	**2019**	
	8.54	8.57	8.44	8.24	8.20	8.16	8.16	8.01	7.97	7.95	
Supervisory Boards	**1999**	**2000**	**2001**	**2002**	**2003**	**2004**	**2005**	**2006**	**2007**	**2008**	**2009**
	8.26	8.27	8.25	8.28	8.19	8.30	8.62	8.60	8.60	8.73	8.55
	2010	**2011**	**2012**	**2013**	**2014**	**2015**	**2016**	**2017**	**2018**	**2019**	
	8.52	8.35	8.42	8.14	8.27	8.34	8.31	8.25	8.02	7.94	
Executive Boards	**1999**	**2000**	**2001**	**2002**	**2003**	**2004**	**2005**	**2006**	**2007**	**2008**	**2009**
	6.26	6.62	6.36	6.58	6.34	6.18	6.34	5.77	5.56	5.49	5.62
	2010	**2011**	**2012**	**2013**	**2014**	**2015**	**2016**	**2017**	**2018**	**2019**	
	5.39	5.24	5.16	5.17	5.15	4.91	5.05	4.91	5.17	5.12	

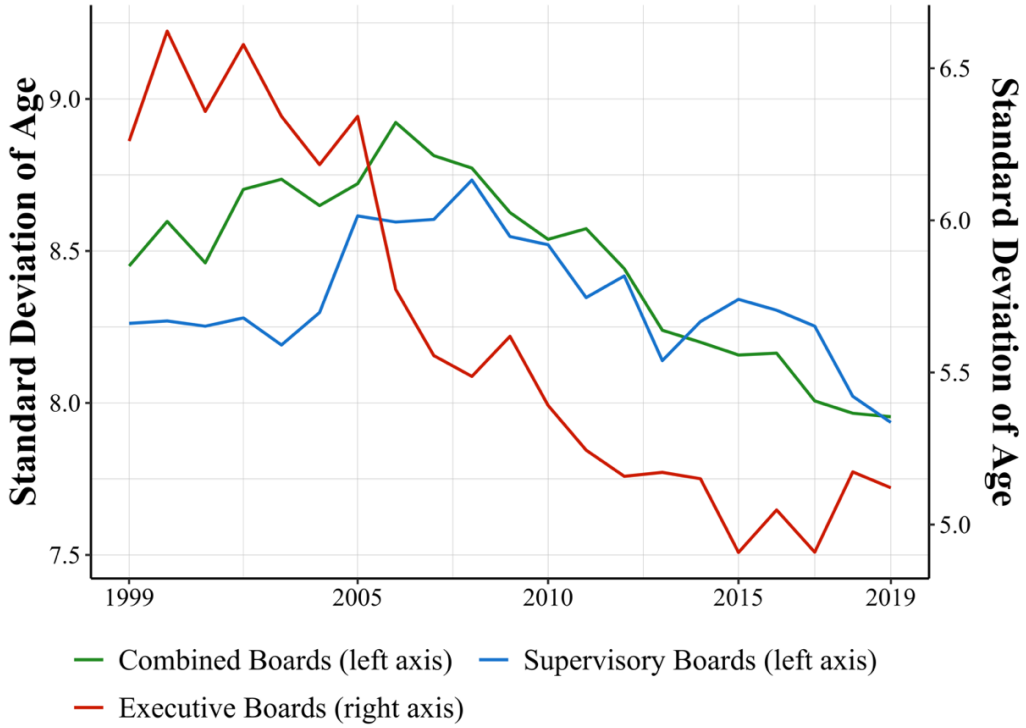

Figure 4: Standard Deviation of Board Members' Age

Notes. The table and the figure present the development of the distinct age diversity characteristic in German listed companies. The Standard Deviation of Board Members' Age represents the board-year average of the age standard deviations of its different members. All values in the table are rounded to two decimals, but the graph is plotted with higher decimal-precision. The number of observations for each age diversity study is presented in *Appendix A*.

nation methods, in light of these negative trends, one might consider an adverse effect on particular measures of company success. However, after breaking down the overall diversity index into its components, Bernile et al. (2018, p.590) expose that no single element of diversity alone drives the relationship between board diversity and firm risk. Besides, the effect of the board diversity index on risk remains significantly negative when the authors combine all components. This is also confirmed by other researchers in this topic (Baranchuk & Dybvig, 2009), asserting that the overall decision-making process depends on the joined effect of different diversity dimensions and not on its distinct parts.

This perspective could also explain the disagreement of previous empirical results that attempted to analyse the effects of specific board diversity attributes on firm performance, innovation processes, et cetera. Nevertheless, further research on board diversity is essential, as numerous determinants might influence its outcome. Thus, the firm's external environment, each country's specific economic and legislative setting, and the influence of globalisation could prompt

Table 5: Financial Expertise and University Affiliation Board Diversity

Financial Expertise Board Diversity											
	1999	**2000**	**2001**	**2002**	**2003**	**2004**	**2005**	**2006**	**2007**	**2008**	**2009**
Combined Boards	0.06	0.08	0.08	0.09	0.11	0.13	0.13	0.15	0.15	0.16	0.16
	2010	**2011**	**2012**	**2013**	**2014**	**2015**	**2016**	**2017**	**2018**	**2019**	
	0.16	0.18	0.19	0.19	0.19	0.19	0.19	0.19	0.19	0.19	
	1999	**2000**	**2001**	**2002**	**2003**	**2004**	**2005**	**2006**	**2007**	**2008**	**2009**
Supervisory Boards	0.00	0.02	0.02	0.02	0.02	0.03	0.03	0.03	0.04	0.04	0.04
	2010	**2011**	**2012**	**2013**	**2014**	**2015**	**2016**	**2017**	**2018**	**2019**	
	0.04	0.05	0.05	0.06	0.06	0.06	0.06	0.06	0.07	0.07	
	1999	**2000**	**2001**	**2002**	**2003**	**2004**	**2005**	**2006**	**2007**	**2008**	**2009**
Executive Boards	0.14	0.18	0.20	0.22	0.26	0.28	0.29	0.30	0.30	0.31	0.32
	2010	**2011**	**2012**	**2013**	**2014**	**2015**	**2016**	**2017**	**2018**	**2019**	
	0.32	0.33	0.35	0.34	0.34	0.35	0.35	0.34	0.34	0.34	
University Affiliation Board Diversity											
	1999	**2000**	**2001**	**2002**	**2003**	**2004**	**2005**	**2006**	**2007**	**2008**	**2009**
Combined Boards	0.77	0.77	0.79	0.80	0.80	0.79	0.77	0.77	0.76	0.76	0.77
	2010	**2011**	**2012**	**2013**	**2014**	**2015**	**2016**	**2017**	**2018**	**2019**	
	0.77	0.74	0.74	0.75	0.76	0.75	0.76	0.76	0.75	0.77	
	1999	**2000**	**2001**	**2002**	**2003**	**2004**	**2005**	**2006**	**2007**	**2008**	**2009**
Supervisory Boards	0.71	0.72	0.72	0.72	0.74	0.73	0.72	0.74	0.72	0.72	0.72
	2010	**2011**	**2012**	**2013**	**2014**	**2015**	**2016**	**2017**	**2018**	**2019**	
	0.72	0.69	0.69	0.71	0.71	0.71	0.71	0.71	0.70	0.71	
	1999	**2000**	**2001**	**2002**	**2003**	**2004**	**2005**	**2006**	**2007**	**2008**	**2009**
Executive Boards	0.68	0.68	0.68	0.67	0.66	0.66	0.63	0.64	0.62	0.62	0.63
	2010	**2011**	**2012**	**2013**	**2014**	**2015**	**2016**	**2017**	**2018**	**2019**	
	0.61	0.60	0.62	0.63	0.61	0.60	0.61	0.60	0.59	0.60	

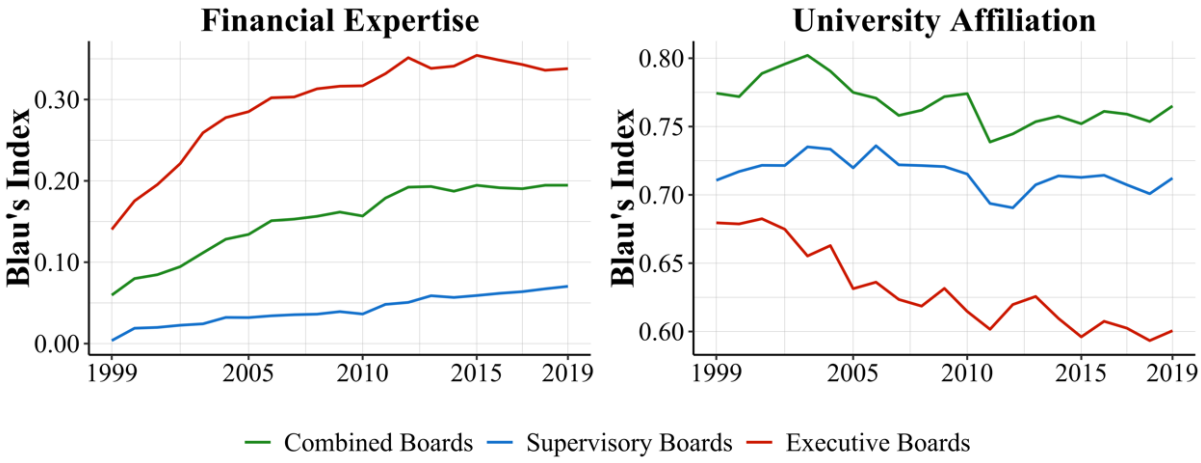

Figure 5: Financial Expertise and University Affiliation Board Diversity

Notes. The tables and the figures present the development of the distinct financial expertise and university affiliation diversity characteristics in German listed companies. The Financial Expertise Board Diversity represents the board-year average values of the Blau's Index regarding the number of financial experts in each board; the University Affiliation Blau's Diversity Index is computed using the information regarding the board members' visited universities, in which they received their latest academic degree (Blau, 1977). All values in the tables are rounded to two decimals, but the graphs are plotted with higher decimal-precision. The number of observations for each board diversity study is presented in *Appendix A*.

diversity trends with its benefits and costs. That is why I would like to give rise to possible questions and propositions for future research, as the issue of board diversity might become even more critical in the following years because of its ethical and economic reasoning. As the focus of this thesis is the diversity trends in *German* listed firms, I would also

Table 6: Mean number of boards in which the directors sit simultaneously

Combined Boards	**1999**	**2000**	**2001**	**2002**	**2003**	**2004**	**2005**	**2006**	**2007**	**2008**	**2009**
	0.89	0.91	0.89	0.84	0.75	0.75	0.61	0.56	0.52	0.48	0.44
	2010	**2011**	**2012**	**2013**	**2014**	**2015**	**2016**	**2017**	**2018**	**2019**	
	0.43	0.38	0.38	0.38	0.36	0.34	0.34	0.34	0.33	0.33	
Supervisory Boards	**1999**	**2000**	**2001**	**2002**	**2003**	**2004**	**2005**	**2006**	**2007**	**2008**	**2009**
	1.07	1.07	1.04	0.98	0.90	0.89	0.73	0.68	0.64	0.59	0.55
	2010	**2011**	**2012**	**2013**	**2014**	**2015**	**2016**	**2017**	**2018**	**2019**	
	0.53	0.47	0.48	0.47	0.46	0.44	0.43	0.42	0.41	0.40	
Executive Boards	**1999**	**2000**	**2001**	**2002**	**2003**	**2004**	**2005**	**2006**	**2007**	**2008**	**2009**
	0.53	0.60	0.56	0.53	0.47	0.46	0.39	0.33	0.31	0.28	0.26
	2010	**2011**	**2012**	**2013**	**2014**	**2015**	**2016**	**2017**	**2018**	**2019**	
	0.24	0.21	0.21	0.21	0.20	0.18	0.17	0.19	0.18	0.19	

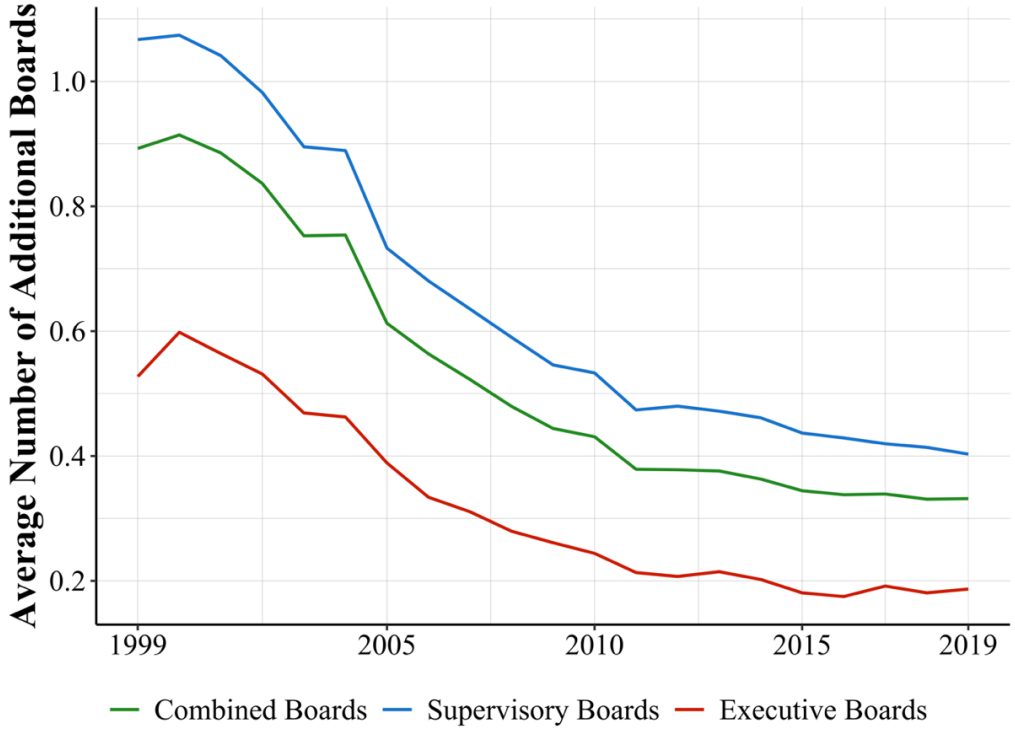

Figure 6: Mean number of boards in which the directors sit simultaneously

Notes. The table and the figure present the development of the distinct board incumbencies diversity characteristic in German listed companies. This diversity study represents the board-year average of the mean number of different boards, in which every board member serves simultaneously. All values in the table are rounded to two decimals, but the graph is plotted with higher decimal-precision. The number of observations for each board incumbencies diversity study is presented in *Appendix A*.

formulate my propositions considering this national context.

Firstly, as board diversity might define the degree to which idiosyncrasies in the board members' motives and the access to information influence the company-wide decision-making process, it should have a first-order impact on the corporate risk that stems from these decisions (Yousaf, Jebran, & Wang, 2021). Thus, board diversity could moderate arrangements and build a synthesis of multiple opinions and knowledge that could benefit companies operating in more volatile environments (Bernile et al., 2018, p.595).

Proposition 1. *Ceteris paribus, a higher level of overall diversity in the boardrooms of German companies is associated with lower firm risk.*

Furthermore, while one might state that a decreased level of risk could curtail shareholder value, the diversity in experience, personal qualities, et cetera might lead to greater monitoring activities and more thorough risk and competitive strategies (Carter et al., 2003; Bernile et al., 2019). This, in turn, could result in advantages for firm profitability and

value, as formulated in the following proposition.

Proposition 2. *Ceteris paribus, there is a positive relationship between overall board diversity and firm performance in German companies.*

Additionally, the enhanced board monitoring activity might also result in a more proper design of the firm's incentive systems and the compensation packages for the executives (Adams & Ferreira, 2009). Moreover, the various backgrounds of the directors could also affect the amount of compensation, as due to globalisation, foreign board members may stimulate the level of salaries, making them globally comparable (Randøy & Nielsen, 2002).

Proposition 3. *Ceteris paribus, a higher level of overall diversity in the boardrooms of German companies is associated with better incentive systems and higher board compensations.*

Lastly, as it has been stated, diversity in backgrounds and experiences could be vital when boardrooms demand creative and novel solutions (Miller & del Carmen Triana, 2009, pp.759-761). As innovation is crucial for the success of many companies, studying the effect of board diversity on R&D investments, which are an essential part of the firm's innovation process, can shed light on the additional effects of diverse boards (Bernile et al., 2018).

Proposition 4. *Ceteris paribus, there is a positive relationship between overall board diversity and the quality and quantity of R&D expenditures in German companies.*

5. Conclusion

Corporate governance theory contends that the board structure strongly influences the board's actions that ultimately affect firm performance (Kim, Burns, & Prescott, 2009). The empirical literature has provided mixed results and conceptual arguments regarding board diversity and its effects on various firm outcomes. That is why Milliken and Martins (1996, p.403) call board diversity "a double-edged sword", as the enhanced creativity and the variety of skills and experiences could also backfire if board members become dissatisfied and fail to identify with the rest of the group, causing conflicts and group fragmentation (Wright & Snell, 1999, p.50). Bearing these aspects in mind, the focus of this thesis was to examine the potential effects of board diversity (and its different facets) on firm performance, firm risk, and other firm outcomes. It becomes apparent that while boardroom diversity might improve the board's monitoring ability, moderate the decision-making process, and foster innovation, the firm's external environment often has the final word when determining whether board diversity is beneficial or rather costly for a specific company. Along the same lines, many researchers denote the importance to boost the different dimensions of diversity simultaneously, emphasising their uniqueness and non-interchangeability, since some diversity components may create more powerful synergies when combined (Pelled, 1996; Williams & O'Reilly III, 1998).

Today, many companies in the developed world endeavour to promote diversity. Public and academic institutions do their best to urge diverse workforces and management teams to introduce, for instance, gender quotas for their corporate regulations (Eckbo, Nygaard, & Thorburn, 2020). That could explain the interest of this thesis to investigate whether there are any evident board diversity trends in Germany, being a country that values equality (Rohrschneider, 1999). After discussing firm internal and external factors that may drive board diversity, the empirical part follows, presenting the actual trends of the overall as well as separate diversity dimensions. One could note that while the general board diversity in German firms has risen since 1999, the main driving forces of this positive trend is the demographic variety between board members, especially regarding gender and nationality. Notwithstanding, some dimensions have been increasingly characterised by homogeneity, as board members tend to have degrees from the same universities or belong to similar age groups.

Albeit proposing exciting paths for future research, this study has some limitations. First, although the award year and the universities are recorded for most of the directors, the degree they obtain is in many cases not registered, prohibiting the analysis of the diversity regarding educational attainments. Thus, following Bernile et al. (2018), who proxy education via the academic institutions where the directors received their bachelor's degree, and adjusting this measure in order to overcome the limitation of the dataset, I consider the educational diversity in terms of the universities where the directors attained their latest degree. However, even with this circumvention, I believe that analysing the variation in the level of the directors' qualifications or even their fields of study could be very valuable to research. That way, the actual difference in the cognitive capacities and knowledge, which are crucial determinants of the monitoring and information processing capabilities (Mahadeo et al., 2012, p.378), could be sufficiently captured.

Moreover, the employed datasets also pose further limitations, as they contain many missing values for various characteristics and, in many cases, incomplete information. That is why in the study of the overall board diversity trend, the number of observations used is comparatively low. Contrarywise, the analyses of the separate diversity dimensions are conducted with much larger samples since fewer restrictions for missing values apply. Yet, this may impede the indices' comparability because of the differences in the population size and damage the precision of the overall index owning to the relatively smaller sample.

In addition, future studies could emphasise other diversity attributes, such as the directors' religion, native tongue, or political preferences. These individual traits might also influence in-board interactions and corporate effectiveness (Carter et al., 2010, p.411), and thus, the research could deliver insights on the optimal board constellation.

Finally, the study's time span covers the years between 1999 and 2019, and only the last three years of this period are affected by the German gender quota regulation. As discussed, the different drivers of diversity are interconnected and interdependent, and as such, it may be fascinating to analyse diversity trends for a more prolonged period after the mandatory quota introduction. Consequently, similar analyses could be conducted in the years to come, after the quota regulations have already rooted in the economy. This could deliver ground-breaking results regarding the long-term effects of board diversity, possibly giving new impulses for further discussions and subsequent policies, aiming to improve corporate governance processes and, consequently, our society.

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